Spatio-temporal data collection and visualization during firefighting incidents

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ABSTRACT

This paper investigates the possibilities and the visualization of sensor data and geographic information for fire incident management. Within the Belgian fire community a survey was launched to explore the necessity and the use of additional sensor data during a fire incident. Furthermore an evaluation of different visualization set-ups was done with mockup screens. Additionally, the use of drones and attached sensors was interrogated and some guidelines for the drone set-up, the data connection and the data visualization were given.

From the survey it was remarked that the thermal imaging device is the most informative device, followed by the explosion warning device and thirdly the visual camera. Similarly, as indicated by Vandecasteele et al. [1], it was pointed out that the more information there is available during an incident the higher the situational awareness is. Especially, the location of the fire source, the amount and the position of the victims and firefighters and the structure and lay-out of the building could be derived from thermal or visual cameras. Likewise recent publications [2, 3] show that the cooperation of smartphone information and drone data could increase the awareness on the scene.

Equal to the collection of the information, the visualization of the sensor data is an important aspect. The survey revealed that 78 percent prefers a roughed tablet, 20 percent selects a laptop whereas only 2 percent would use a smartphone device. Furthermore, depending on the incident type different real-time data graphs needs to be shown.

The last part of the paper lists the current available drones, also referred as unmanned aircraft systems, for firefighting incidents. It is important to remark that due the limited flight time and the non-resistance to high temperatures there are currently no systems available for indoor fire incident exploration. Still, due there speed and outdoor reach it is already possible to assist in risk assessment, mapping, and planning and in reducing the exposure to danger of firefighters. Future research is necessary to create protected drones and to ensure a stable communication on the incident site, but preliminary results show the possibility of a drone in fire incident.

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References

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